DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7, 15-20 and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salokannel et al. (US 20050249173 A1), hereafter "Salokannel," in view of Ho et al. (US 20050259754 A1), hereafter "Ho."

3. Consider claim 1, Salokannel discloses a radio communication method by which radio communication apparatuses transmit beacons using beacon periods so that the beacons do not conflict with one another, comprising (see abstract, [0011]): Salokannel also teaches a detection step in which a radio communication apparatus detects whether in the beacon period there are empty beacon slots before the beacon slot which is the period for transmitting beacons of that radio communication apparatus (see Fig 7, [0009], [0098]. Salokannel also teaches a step in which the radio communication apparatus adds to a beacon moving status information for notifying the other radio communication apparatuses of the beacon slot movement processing state of the radio communication apparatus and also adds to the beacon beacon period occupancy information that consists of moving status information received from the other radio

communication apparatuses, identifiers for specifying the radio communication apparatuses sending the moving status information, and a beacon slot position, which are linked, and transmits the beacon at the beacon slot of the radio communication apparatus (see Fig 9, [0016], [0103] and [0104]; Salokannel also teaches a step in which, after elapse of the specified number of super frames, the radio communication apparatus moves its beacon to the empty beacon slot and transmits the beacon (see Fig 8, [0099], [0102].

Salokannel discloses a multiple nodes communication system using repeating patterns of super frames, where each of the super frames includes a beacon period. A beacon slot in a Media Access Slot, which is reserved by the plurality of nodes. The reserved slot occurs in the beginning of the beacon period and is used for communicating information relating to the super frame configuration. This information may involve adjustments to the number of Media Access Slots reserved for beaconing, but does not particularly refer to a step in which, when such empty beacon slots are detected in the detection step, the radio communication apparatus starts count of a specified number of super frames after which the beacon slot of the radio communication apparatus will be moved to one of the empty beacon slots. Ho teaches a radio communication apparatus starts count of a specified number of super frames after which the beacon slot of the radio communication apparatus will be moved to one of the empty beacon slots (see [0064]).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the invention of Salokannel and have it include a step in

which, when such empty beacon slots are detected in the detection step, the radio communication apparatus starts count of a specified number of super frames after which the beacon slot of the radio communication apparatus will be moved to one of the empty beacon slots, as taught by Ho. The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships (see [0008]).

Consider claim 2, Salokannel as modified by Ho teaches claim 1, Ho further teaches that the countdown of a specified number of super frames is not performed in a period in which beacons of the other radio communication apparatuses are present from the beacon slot of the radio communication apparatus in question until the end of the beacon period (see [0064]). The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships, as discussed by Ho (see [0008]).

Consider claim 3 and 10, Salokannel as modified by Ho teaches claim 1, Salokannel further teaches the specified number of super frames is at least 2 (see Fig 2A, 2B [0047]).

Consider claims 4, 11, 23 and 24, Salokannel as modified by Ho teaches claim 1, Salokannel further teaches when the radio communication apparatus detects a change of beacon formation, that is, the arrangement of beacon slot positions of the radio communication apparatus, by checking the beacon and the beacon period occupancy information received by the radio communication apparatus, the radio communication

apparatus performs detection of an empty beacon slot and movement processing for moving its beacon slot position to the empty slot (see [007] - [0078]).

Consider claims 5 and 12, Salokannel as modified by Ho teaches claim 1, Ho further teaches that the moving status information is a counter value of a movable counter that counts the specified number of super frames or a flag (see [0064]). The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships, as discussed by Ho (see [0008]).

Consider claim 6, 25 and 26, Salokannel as modified by Ho teaches claim 1, Salokannel further teaches a radio communication apparatus secures at least the lowest two slots of the beacon formation as entry slots not performing data communication and, in the start transmission of a beacon with a radio communication apparatus joining a radio network anew or again, transmits the beacon at a slot selected at random from among these entry slots, this becoming the beacon slot position of the radio communication apparatus (see Fig 7, [0099] and [0105]).

Consider claims 7, 27 and 28, Salokannel as modified by Ho teaches claim 1, Salokannel further teaches a radio communication apparatus that adds beacon slot length information that indicates the length of the period down to the lowest slot of the beacon formation recognized by the radio communication apparatus, and in that the radio communication apparatus receives beacons but does not perform data communication in a period calculated by adding the entry slot length to the maximum beacon slot length found from the beacon slot length information received from neighboring radio communication apparatuses (see [0061] and [0064]).

Consider claims 18, Salokannel as modified by Ho teaches claim 1, Ho also teaches count and the other radio communication apparatuses are reset to the specified counter value (see [0064]). The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships (see [0008]).

Consider claims 19, Salokannel as modified by Ho teaches claim 1, Ho also teaches count and the other radio communication apparatuses are reset to the specified counter value. (see [0064]). The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships (see [0008]).

Consider claims 15, 16, 17, 20, Salokannel as modified by Ho teaches claim 1, Salokannel further teaches a radio communication apparatus repeatedly selects the next highest empty slot in the next super frame until the radio communication apparatus is in the lowest slot (see [0065]).

4. Claims 8-14, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salokannel et al. (US 20050249173 A1), hereafter "Salokannel," in view of Ho et al. (US 20050259754 A1), hereafter "Ho," further in view of Nishiyama et al.(US 20050036475 A1), hereafter "Nishiyama."

Consider claims 8, Salokannel discloses a beacon receiving unit that receives a beacon and extracts a frame (see Fig 2, [0100]). Salokannel also teaches a frame judging unit that judges whether the extracted frame is a beacon frame and records

beacon period occupancy information that consists of the reception slot position of the beacon, an identifier specifying the radio communication apparatus that transmitted the beacon, and moving status information indicating whether the radio communication apparatus that transmitted the beacon is moving its beacon slot position, which are linked, and also records the beacon period occupancy information included in the beacon frame (see Fig 7, 8, [0011], [0016]). Salokannel teaches a frame forming unit that forms, in response to the instruction from the beacon transmission command unit, a beacon frame including the beacon period occupancy information generated from the received beacon, moving status information of the radio communication apparatus, and beacon slot length information indicating the total length of beacon slots calculated from the beacon received by the radio communication apparatus ([0012] - [0016]).

Salokannel, however, does not particular disclose a beacon slot position control unit that sets, when empty beacon slots before the beacon slot of the radio communication apparatus are detected in a beacon period by checking all the beacon period occupancy information. Ho teaches a beacon slot position control unit that sets, when empty beacon slots before the beacon slot of the radio communication apparatus are detected in a beacon period by checking all the beacon period occupancy information recorded in the recording unit, the counter value in a movable counter of the specified number of super frames until the beacon slot of the radio communication apparatus is moved to the empty beacon slot, and commands change of the beacon slot position of the radio communication apparatus in response to a notice of completion of countdown from the movable counter (see [0064]).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the invention of Salokannel and have it include a beacon slot position control unit that sets, when empty beacon slots before the beacon slot of the radio communication apparatus are detected in a beacon period by checking all the beacon period occupancy information, as taught by Ho. The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships (see [0008]).

Salokannel, also, does not particular disclose a beacon transmission command unit that detects its own slot position that had been determined by the beacon slot position control unit, and orders transmission of a beacon. Nishiyama discloses a beacon transmission command unit that detects its own slot position that had been determined by the beacon slot position control unit, and orders transmission of a beacon (see Fig 1 #111, [0095] and [0096]).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the invention of Salokannel and have it include a beacon transmission command unit that detects its own slot position that had been determined by the beacon slot position control unit, and orders transmission of a beacon, as taught by Nishiyama (see [0040]). The motivation would have been in order to allow data transmission to be efficiently performed under an ad-hoc communication environment (see [0040]).

Consider claim 9, Salokannel as modified by Ho and further modified by Nishiyama, teaches claim 8, Ho further teaches that the countdown of a specified

number of super frames is not performed in a period in which beacons of the other radio communication apparatuses are present from the beacon slot of the radio communication apparatus in question until the end of the beacon period (see [0064]). The motivation would have been in order to provide synchronizing clocks of transmitters and receivers and preserving packet timing relationships, as discussed by Ho (see [0008]).

Consider claim 13, Salokannel as modified by Ho and further modified by Nishiyama, teaches claim 8. Nishiyama also teaches random selection of a slot among neighboring communication stations (see [0167]). The motivation would have been in order to allow data transmission to be efficiently performed under an ad-hoc communication environment (see [0040]).

Consider claim 14, Salokannel as modified by Ho and further modified by Nishiyama, teaches claim 8. Nishiyama also teaches adding the length of the entry slots to the maximum beacon slot length found in the beacon slot length information received from neighboring (see [0098] - [0100]). The motivation would have been in order to allow data transmission to be efficiently performed under an ad-hoc communication environment (see [0040]).

Consider claim 21, Salokannel as modified by Ho and further modified by Nishiyama, teaches claim 8. Nishiyama also teaches notifies the other radio communication apparatuses that this empty beacon slot will be the movement destination beacon slot position (see Fig 2, [0104] - [0106]). The motivation would have

been in order to allow data transmission to be efficiently performed under an ad-hoc communication environment (see [0040]).

Consider claims 22, Salokannel as modified by Ho and further modified by Nishiyama, teaches claim 8. Nishiyama also discloses a beacon slot position control unit (see Fig 1 #110, [0095] - [0097]). The motivation would have been in order to allow data transmission to be efficiently performed under an ad-hoc communication environment (see [0040]).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Marcos Batista, whose telephone number is (571) 270-5209. The Examiner can normally be reached on Monday-Thursday from 8:00am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Derrick Ferris can be reached at (571) 272-3123. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Marcos Batista
/M. B./
01/29/2008

/Derrick W Ferris/
Supervisory Patent Examiner, Art Unit 4134